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A PEEK AT LOSSES OF NATIONAL RESOURCES FROM WILDFIRE ON THE NATIONAL FORESTS

PREPARED BY
M.M.NELSON
CALIFORNIA REGION

~~Annex 1~~
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FOREST SERVICE SAN FRANCISCO 11, CALIFORNIA

June 2, 1954

TO : REGIONAL FORESTERS, R-1, R-2, R-3, R-4,
R-6, R-7, R-8, R-9, R-10

: DIRECTORS, EXPERIMENT STATIONS:
Central States, Intermountain,
Lake States, Northeastern, Northern Rocky Mountain,
Pacific Northwest, Rocky Mountain, Southeastern,
Southern, Southwestern

FOREST SERVICE
PACIFIC NORTHWEST EXPERIMENT STATION
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JUN 7 1954
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FROM : REGIONAL FORESTER, R-5, By

SUBJECT: F-STATISTICS-General

In Region 5 we have been putting on somewhat of a campaign to keep our field people better informed on subjects which concern them and the entire natural resource field. In line with this program our Division of Fire Control prepared for use in the California Region the attached item, entitled "A Peek at Losses of National Resources from Wildfire on the National Forests." Primarily, it contains statistical material prepared for and used in the recent national Fire Control Conferences at Ogden and Washington, D.C.

At the Regional Foresters-Directors Meeting, Assistant Chief Cliff made a specific point that we should send copies of any such material as this to all regions and all directors.

D Payne

Attachment

cc: Washington Office
with 3 enclosures

Good ideas for illustration here - Ego

Bill: Are the periods given in the charts "running" averages? They overlap.
Geo

FOREST SERVICE SAN FRANCISCO 11, CALIFORNIA

April 15, 1954

Forest Officers
California Region

The material contained in this booklet is primarily charts which show resource losses from fire in the United States. This material was gathered together and used at the Ogden and Washington Fire Control Conferences this year. The purpose of sending it to you at this time is to keep you informed of the overall fire control situation insofar as resource losses are concerned.

The first set of charts combines for all regions in continental United States resource losses in various forms--volume of timber lost, area burned, and values of resource losses. You should keep in mind that these are the losses for national forest land only. The last chart in this series is a summary type chart of the others. It shows the same resource losses, comparing the period 1945-48 with period 1949-52. You will note that our losses from fire have increased in every department. The value of our losses compared with other years is of particular significance. It is one way of showing the increased value of the resources that are being protected.

The second series of charts is all prepared on the same scale. It is a quick way of illustrating where the losses in the United States are occurring by comparing one region against the others.

Finally, in the back of this booklet is a mimeographed copy of the paper which was prepared and presented at the Ogden meeting entitled "Resource Losses and their Overall Significance". The charts which are contained herein were used at the Ogden meeting to illustrate this paper.

Very truly yours,

M M Nelson

M. M. NELSON, Chief
Division of Fire Control

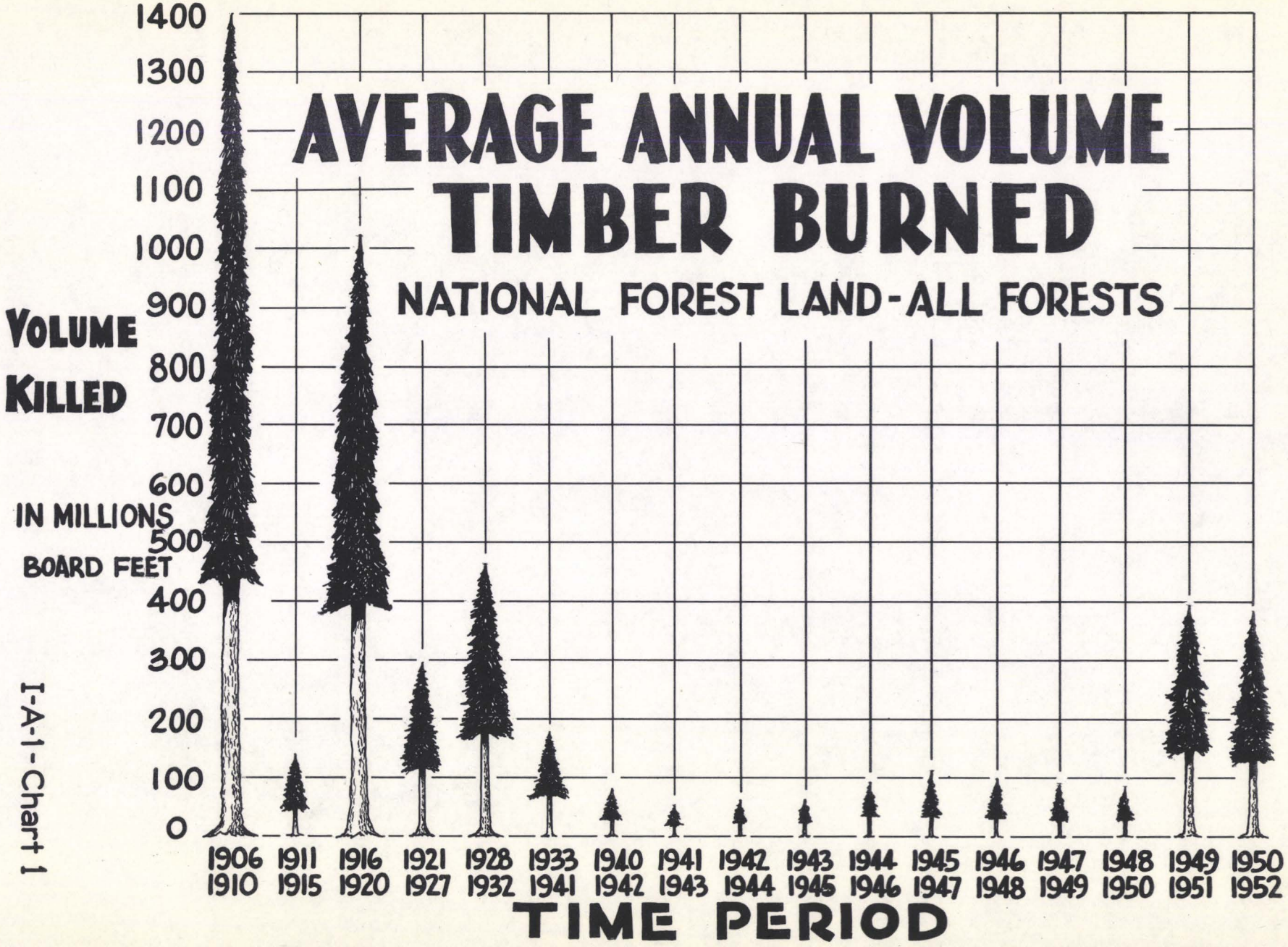
A LOOK AT THE

SERVICE-WIDE RESOURCE LOSSES FROM FIRE

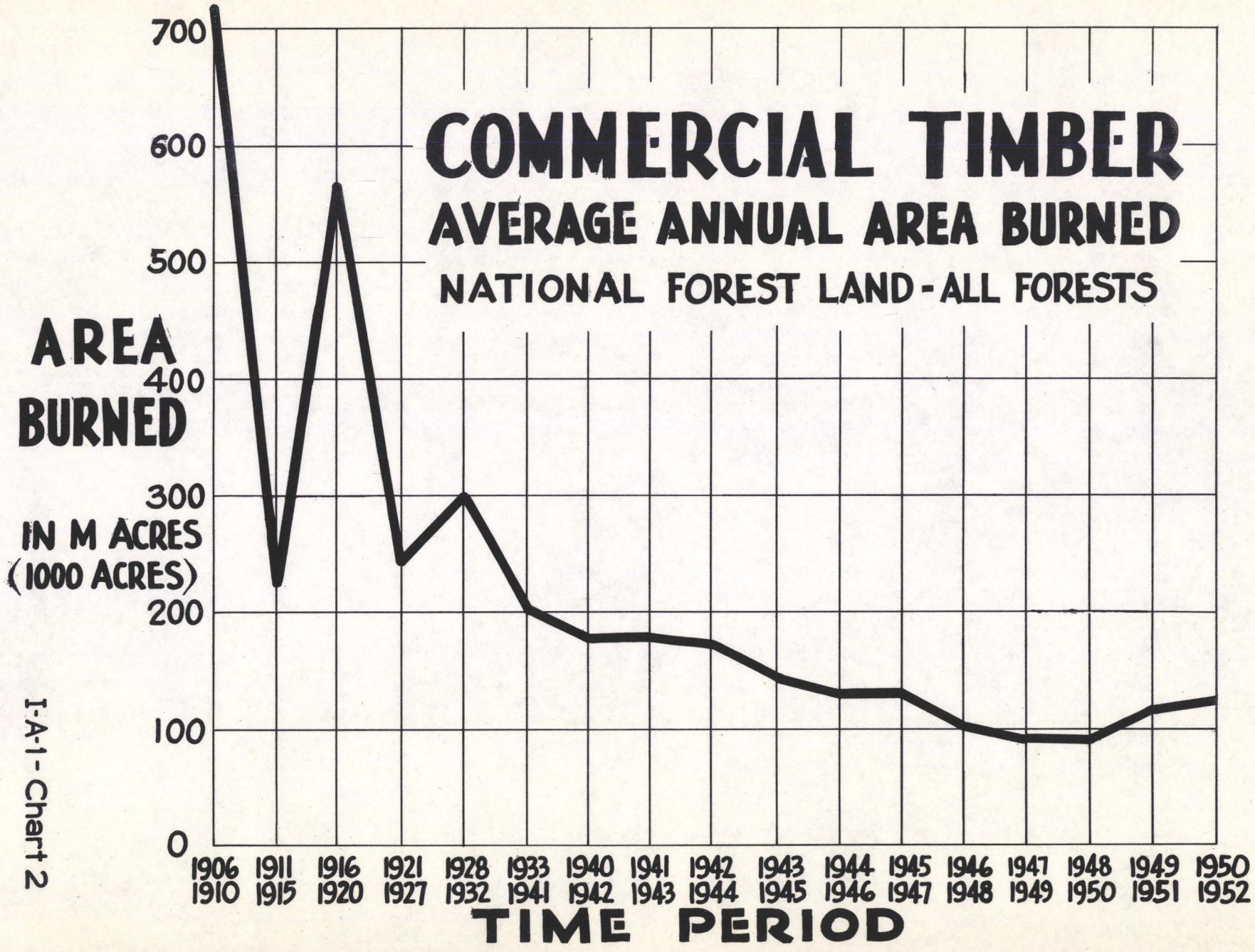
The following charts indicate natural resource losses from national forest lands only throughout the United States. Six different measurements are used:

1. Volume of timber burned.
2. Area of commercial forest land burned.
3. Area of young growth timber burned.
4. Area of non-commercial forest land burned.
5. Value timber resources damaged.
6. Value non-timber resources damaged.

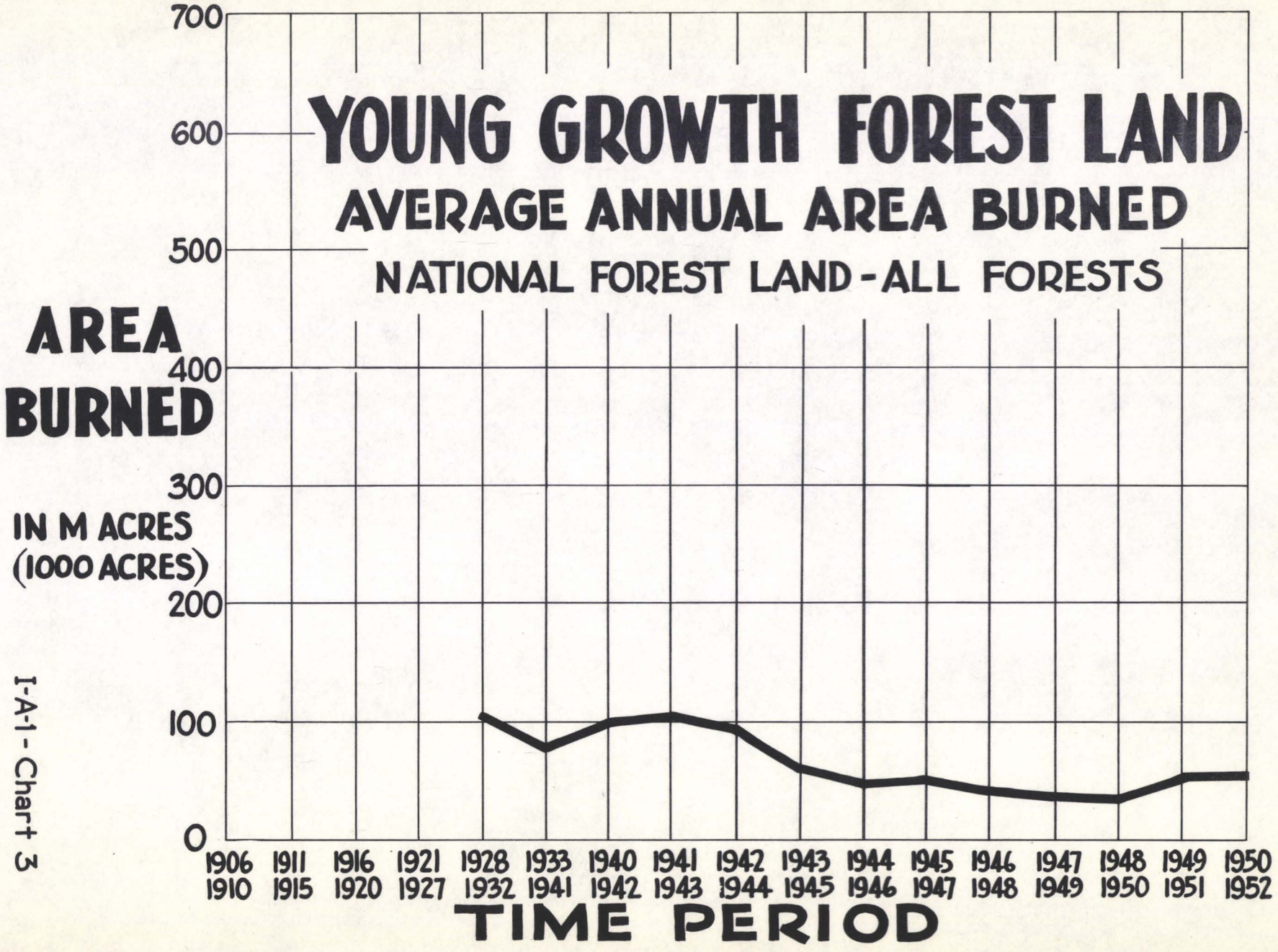
A DISTURBING NOTE: Resource loss from fire shows an UPWARD TREND in latter part of last 12-year period.


AVERAGE ANNUAL VOLUME
TIMBER BURNED
NATIONAL FOREST LAND - ALL FORESTS
VOLUME KILLED
IN MILLIONS
BOARD FEET
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
1906 1910
1911 1915
1916 1920
1921 1927
1928 1932
1933 1941
1940 1942
1941 1943
1942 1944
1943 1945
1944 1946
1945 1947
1946 1948
1947 1949
1948 1950
1949 1951
1950 1952
TIME PERIOD

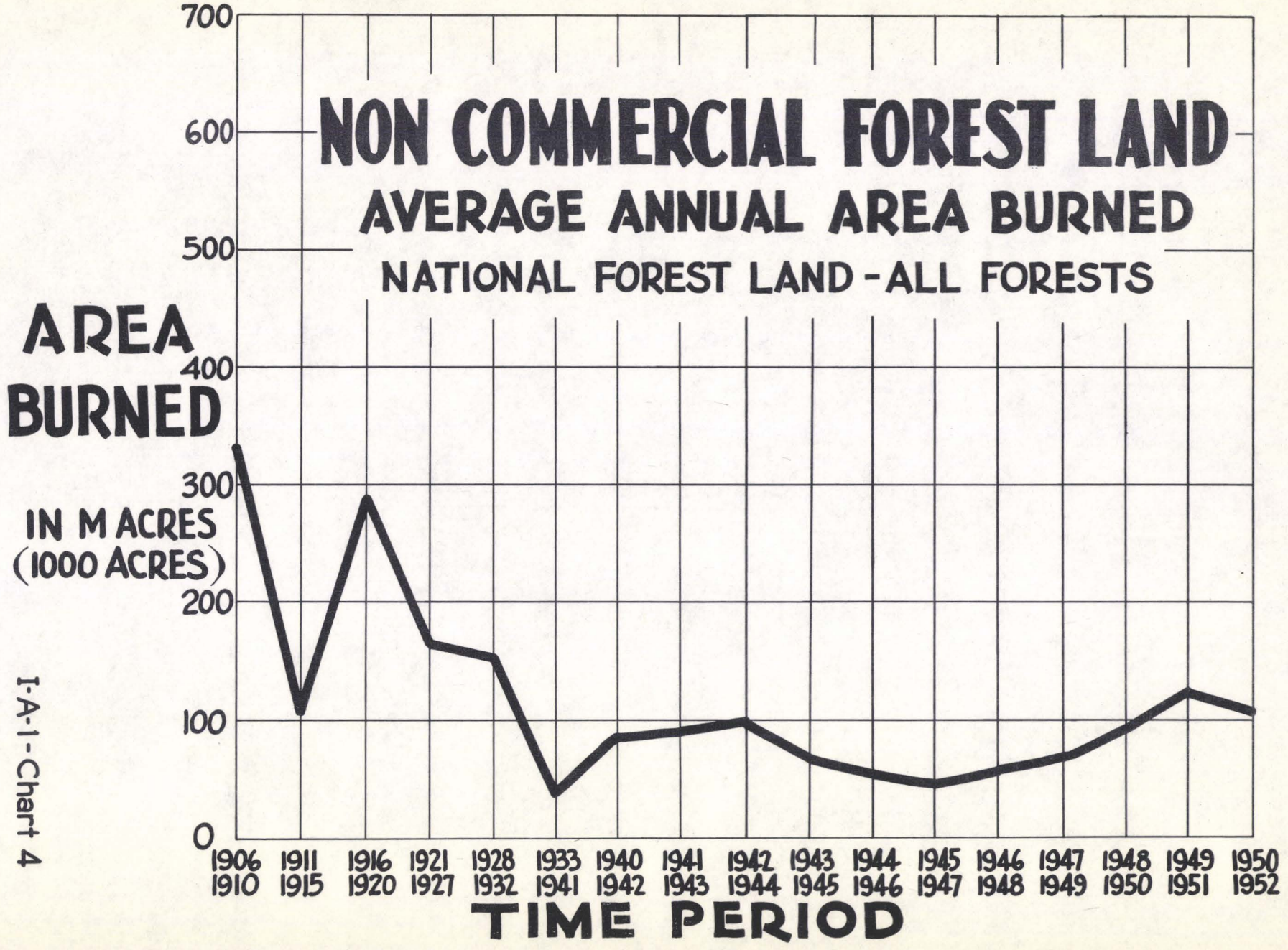
I-A-1-Chart 1


COMMERCIAL TIMBER
AVERAGE ANNUAL AREA BURNED
NATIONAL FOREST LAND - ALL FORESTS
AREA BURNED IN M ACRES (1000 ACRES)
700
600
500
400
300
200
100
0
1906 1910
1911 1915
1916 1920
1921 1927
1928 1932
1933 1941
1940 1942
1941 1943
1942 1944
1943 1945
1944 1946
1945 1947
1946 1948
1947 1949
1948 1950
1949 1951
1950 1952
TIME PERIOD

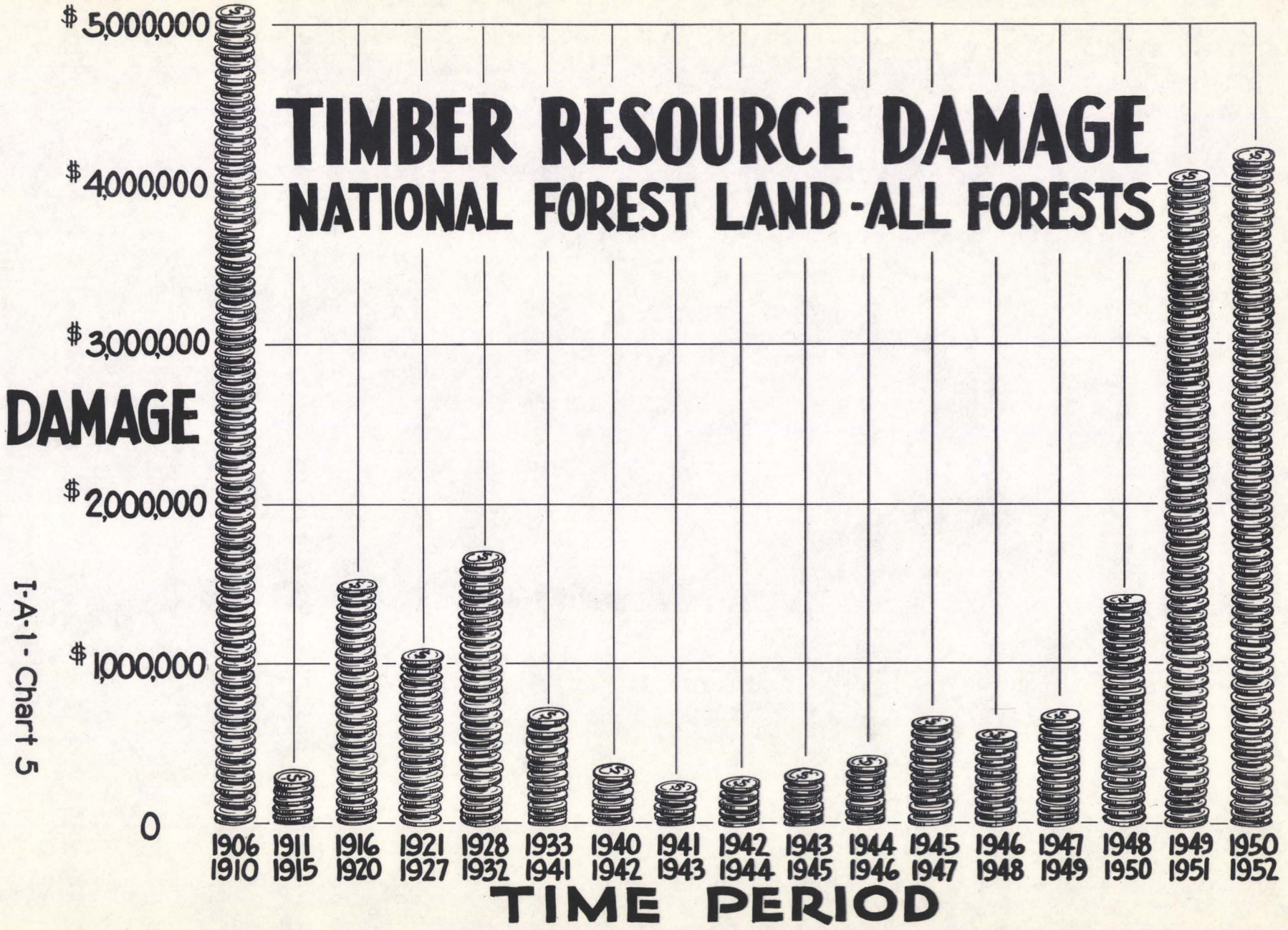
I-A-1 - Chart 2


YOUNG GROWTH FOREST LAND
AVERAGE ANNUAL AREA BURNED
NATIONAL FOREST LAND - ALL FORESTS
AREA BURNED
IN M ACRES
(1000 ACRES)
700
600
500
400
300
200
100
0
1906 1910
1911 1915
1916 1920
1921 1927
1928 1932
1933 1941
1940 1942
1941 1943
1942 1944
1943 1945
1944 1946
1945 1947
1946 1948
1947 1949
1948 1950
1949 1951
1950 1952
TIME PERIOD

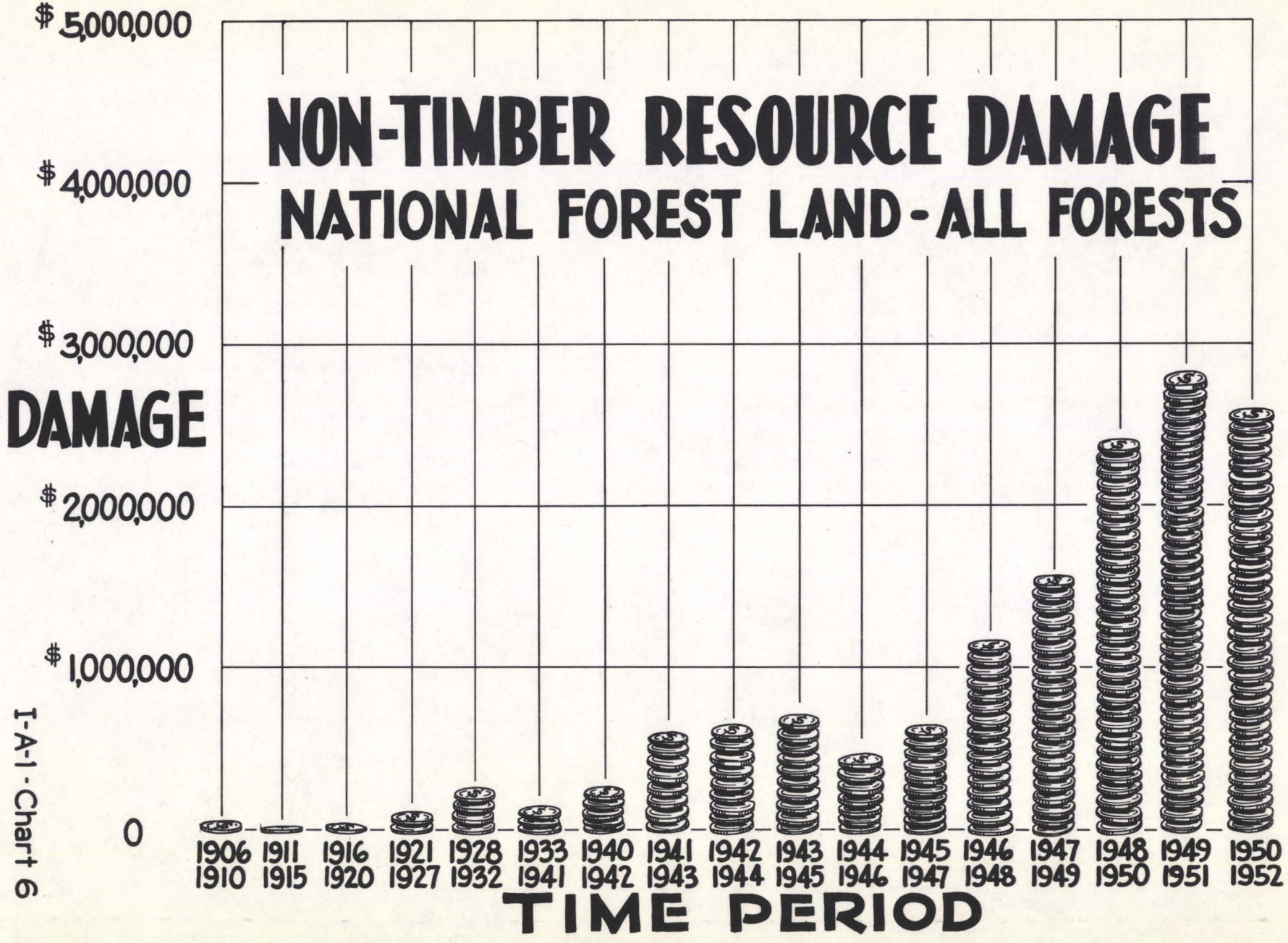
I-A-1 - Chart 3


NON COMMERCIAL FOREST LAND
AVERAGE ANNUAL AREA BURNED
NATIONAL FOREST LAND - ALL FORESTS
AREA BURNED
IN M ACRES
(1000 ACRES)
700
600
500
400
300
200
100
0
1906 1910
1911 1915
1916 1920
1921 1927
1928 1932
1933 1941
1940 1942
1941 1943
1942 1944
1943 1945
1944 1946
1945 1947
1946 1948
1947 1949
1948 1950
1949 1951
1950 1952
TIME PERIOD

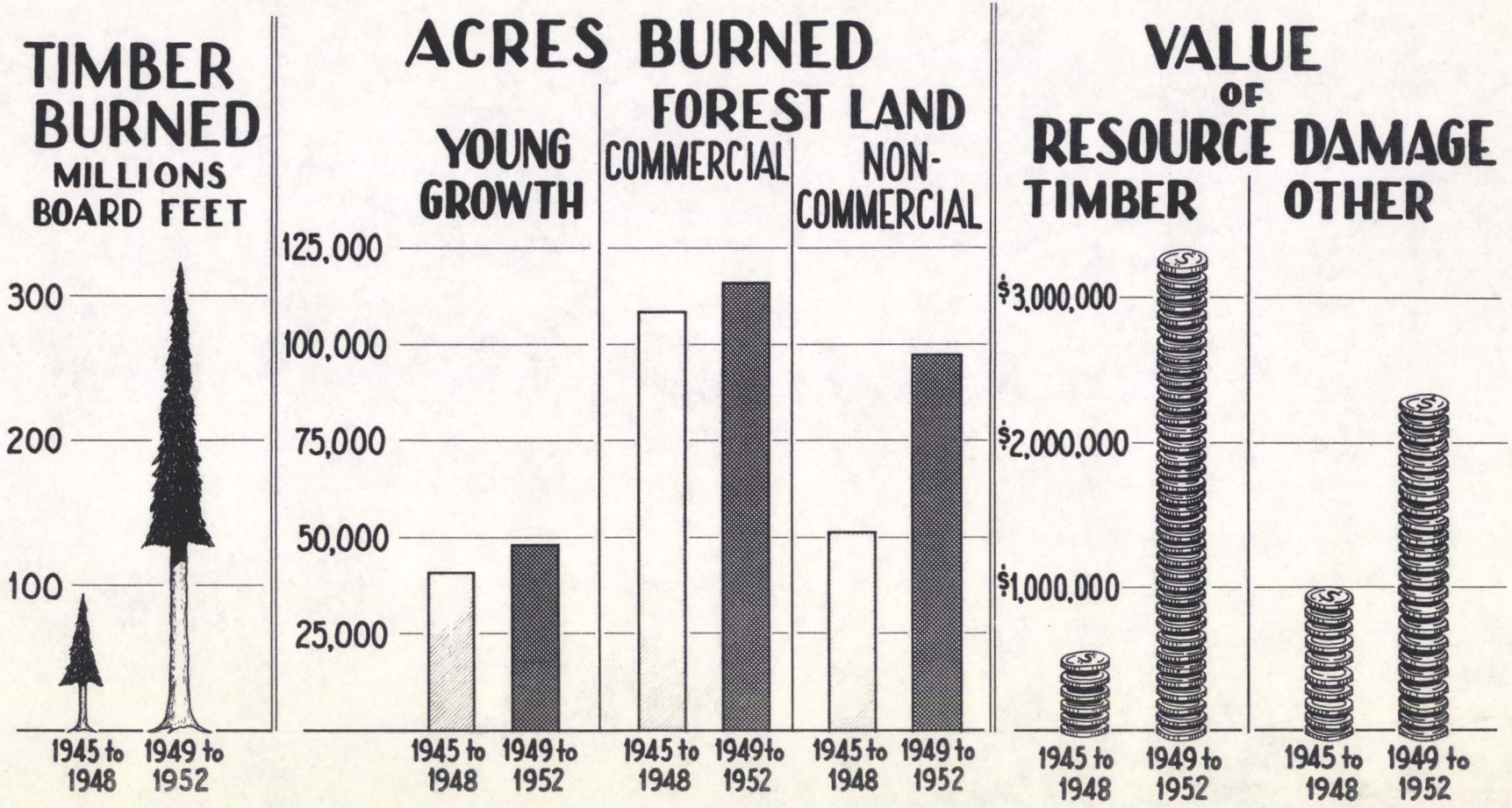
I-A-1-Chart 4


TIMBER RESOURCE DAMAGE
NATIONAL FOREST LAND - ALL FORESTS
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
0
DAMAGE
1906 1910
1911 1915
1916 1920
1921 1927
1928 1932
1933 1941
1940 1942
1941 1943
1942 1944
1943 1945
1944 1946
1945 1947
1946 1948
1947 1949
1948 1950
1949 1951
1950 1952
TIME PERIOD

I-A-1 - Chart 5


NON-TIMBER RESOURCE DAMAGE
NATIONAL FOREST LAND - ALL FORESTS
$5,000,000
$4,000,000
$3,000,000
DAMAGE
$2,000,000
$1,000,000
0
1906 1910
1911 1915
1916 1920
1921 1927
1928 1932
1933 1941
1940 1942
1941 1943
1942 1944
1943 1945
1944 1946
1945 1947
1946 1948
1947 1949
1948 1950
1949 1951
1950 1952
TIME PERIOD
I-A-1 - Chart 6

AVERAGE ANNUAL RESOURCE LOSSES
NATIONAL FOREST LAND - ALL FORESTS



RESOURCE LOSSES IN CALIFORNIA REGION
IN
RELATION TO OTHER REGIONS

The following four charts show resource losses of the California Region and other adjacent regions (period 1940 to 1953).

Note: California Region losses (for period 1949 to 1952) are

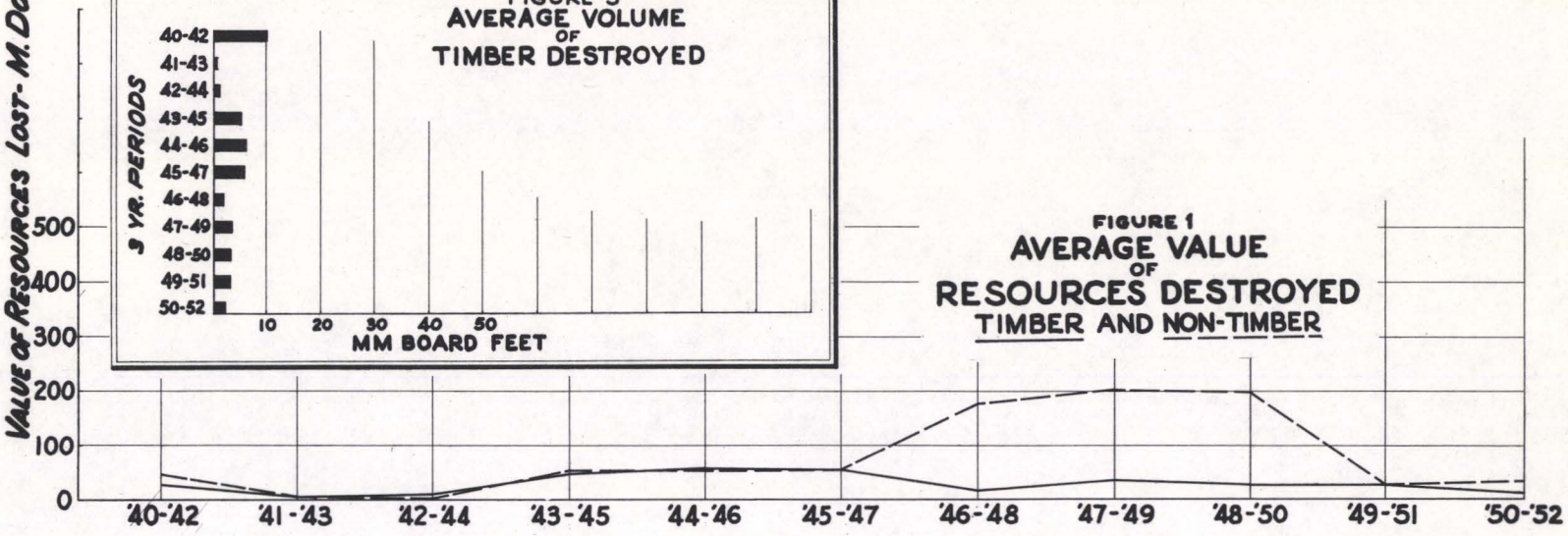
Greater than any other region for:

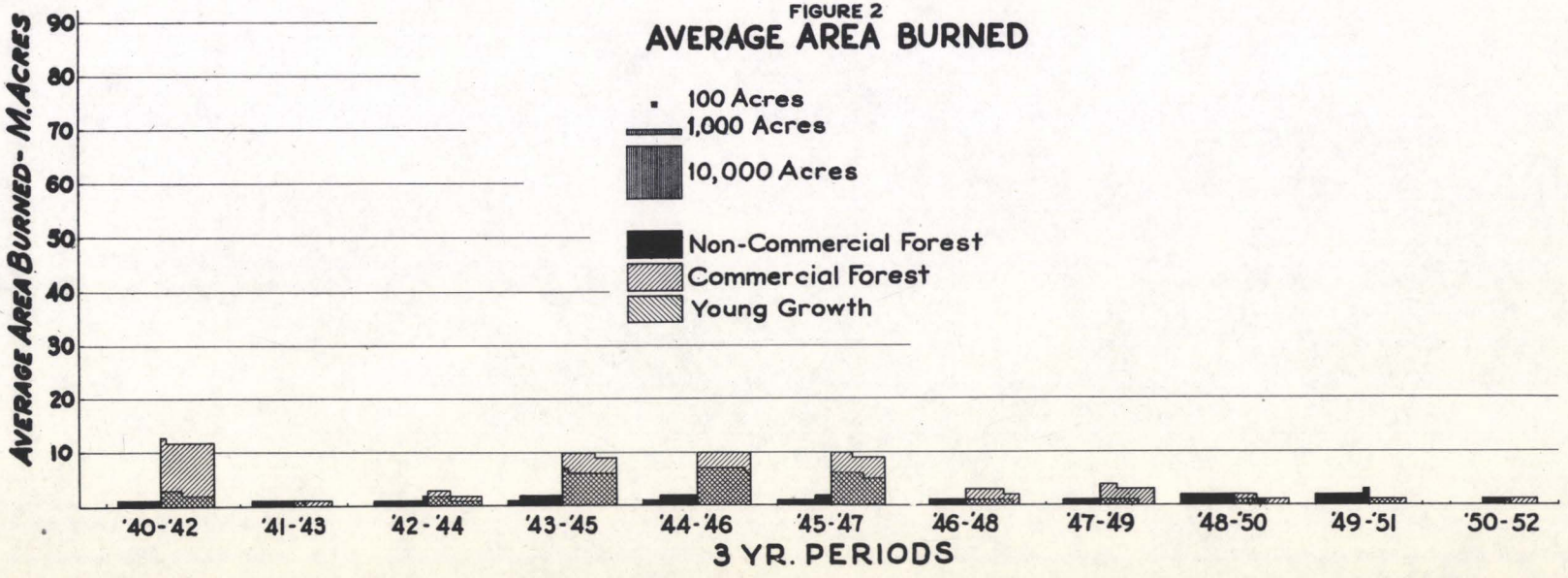
1. Area of watershed lost.
2. Area of young growth lost.
3. Damages to timber resources.
4. Damages to non-timber resources.

Second greatest for:

1. Volume of timber burned. (R-6 greatest)
2. Area of commercial timber land burned (R-8 greatest)

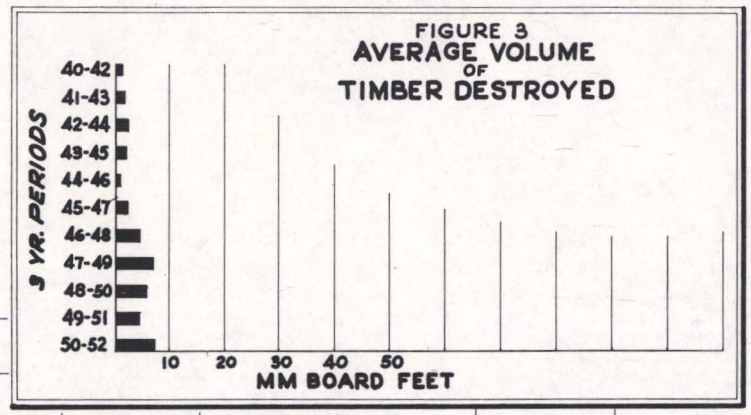
FIRE LOSSES - REGION 1
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES

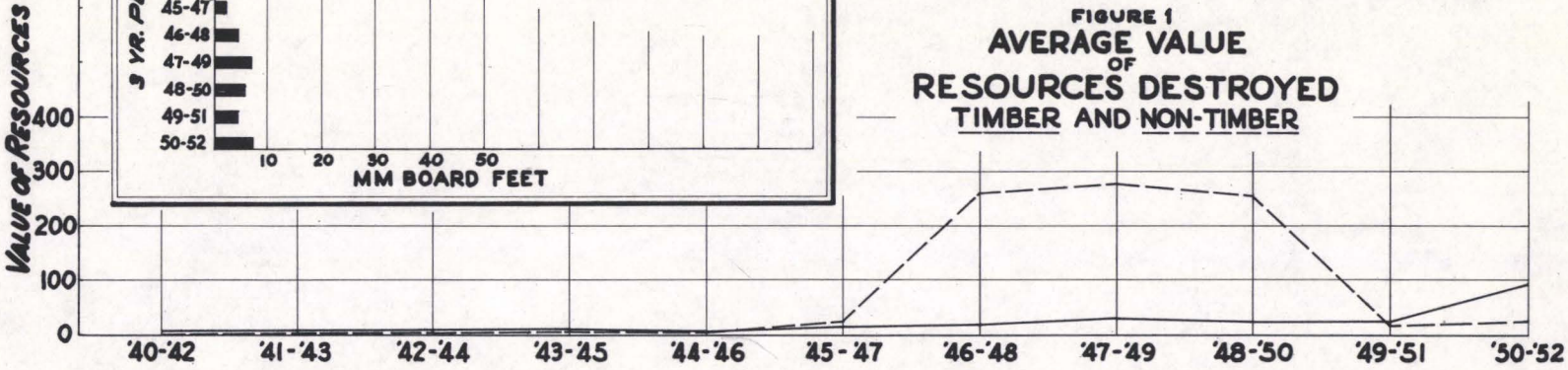


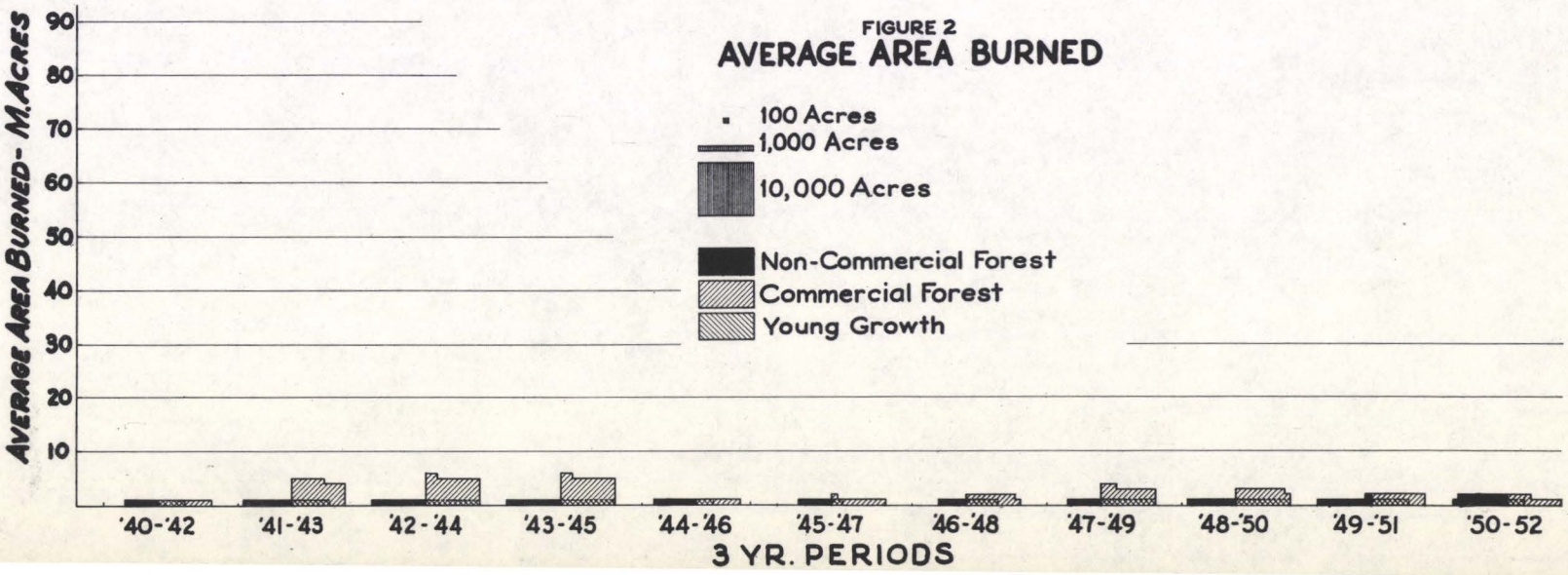


I-A-1 - Chart 7

FIRE LOSSES - REGION 2
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES

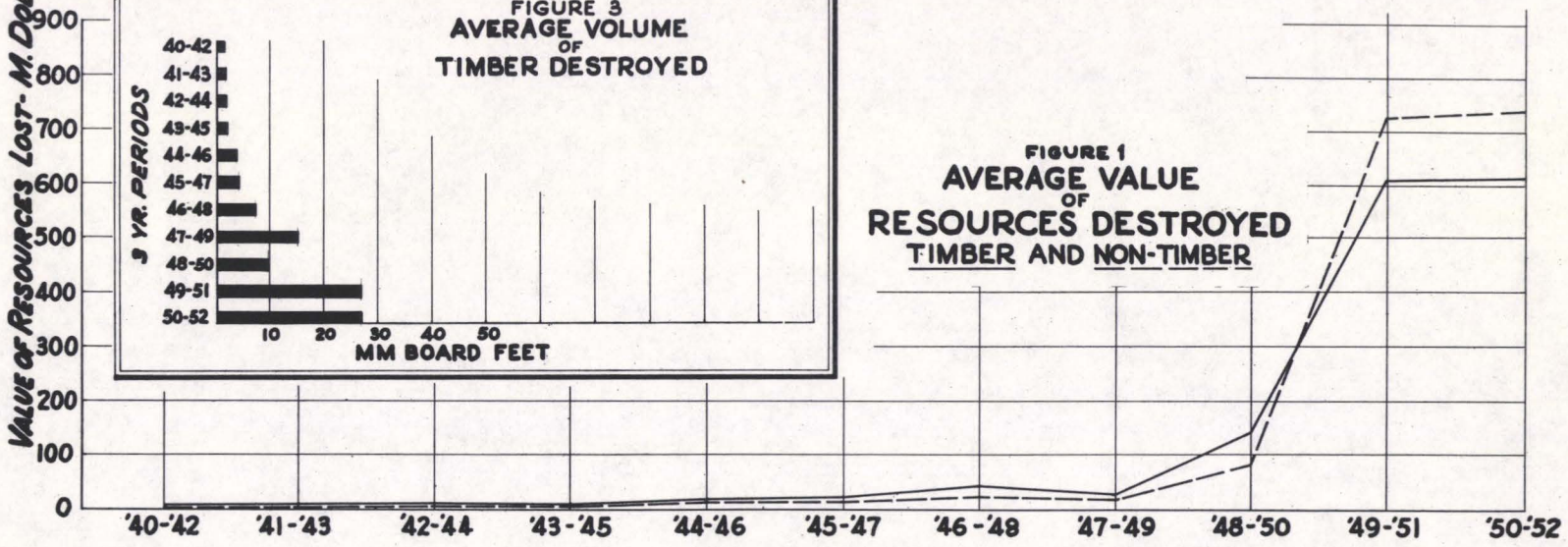


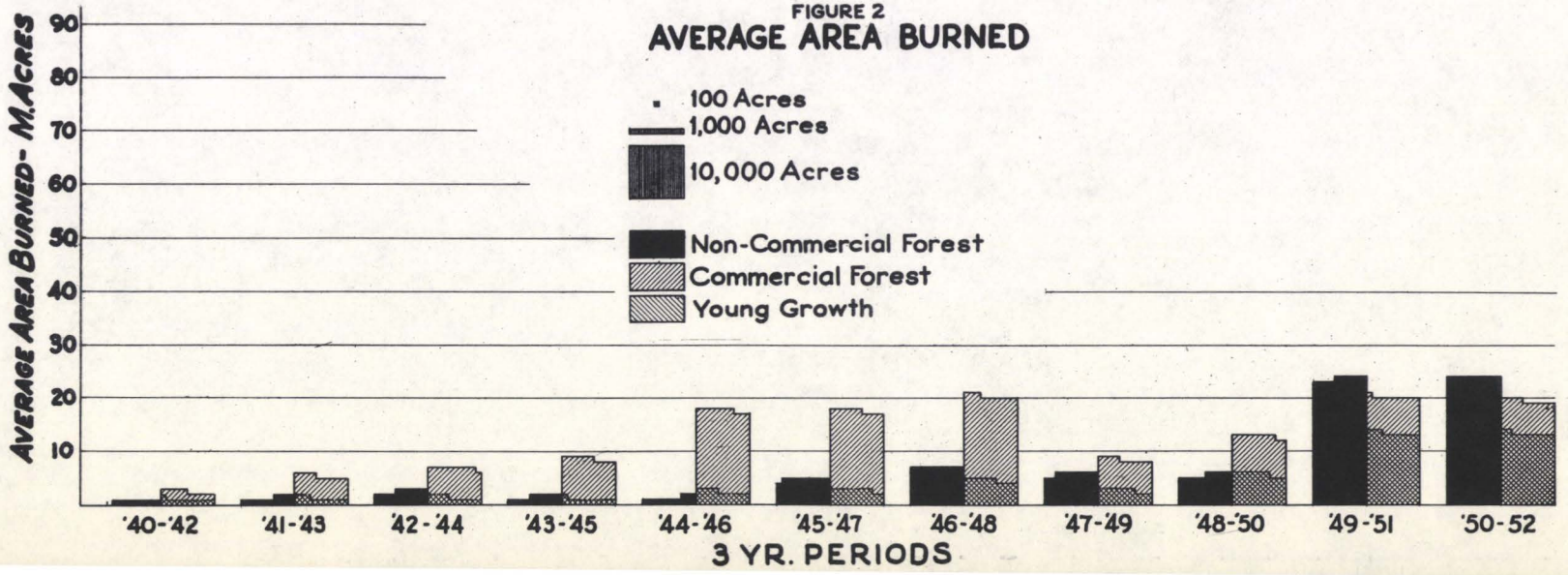




I-A-1 - Chart 8

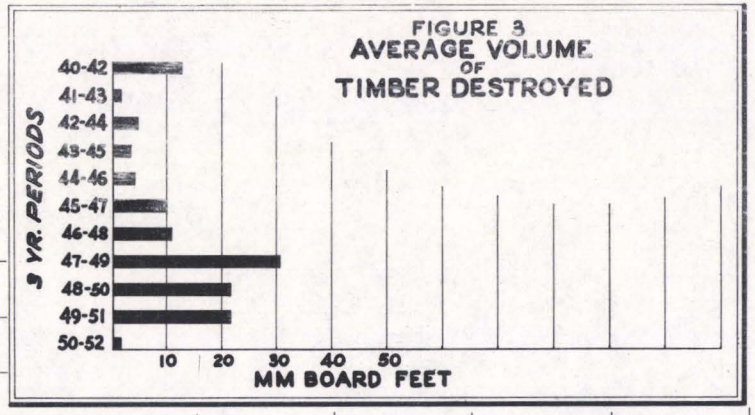
FIRE LOSSES - REGION 3
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES

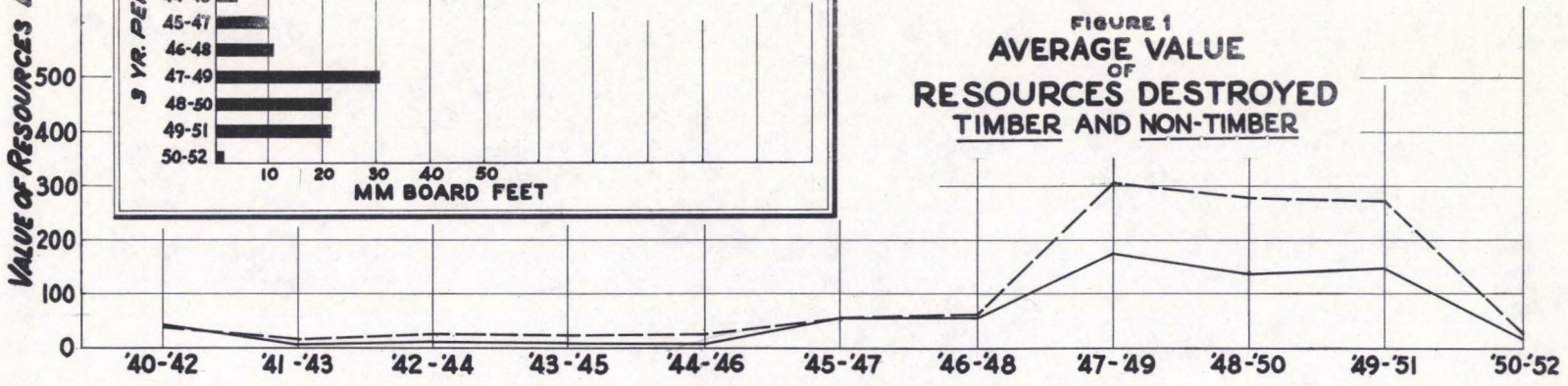


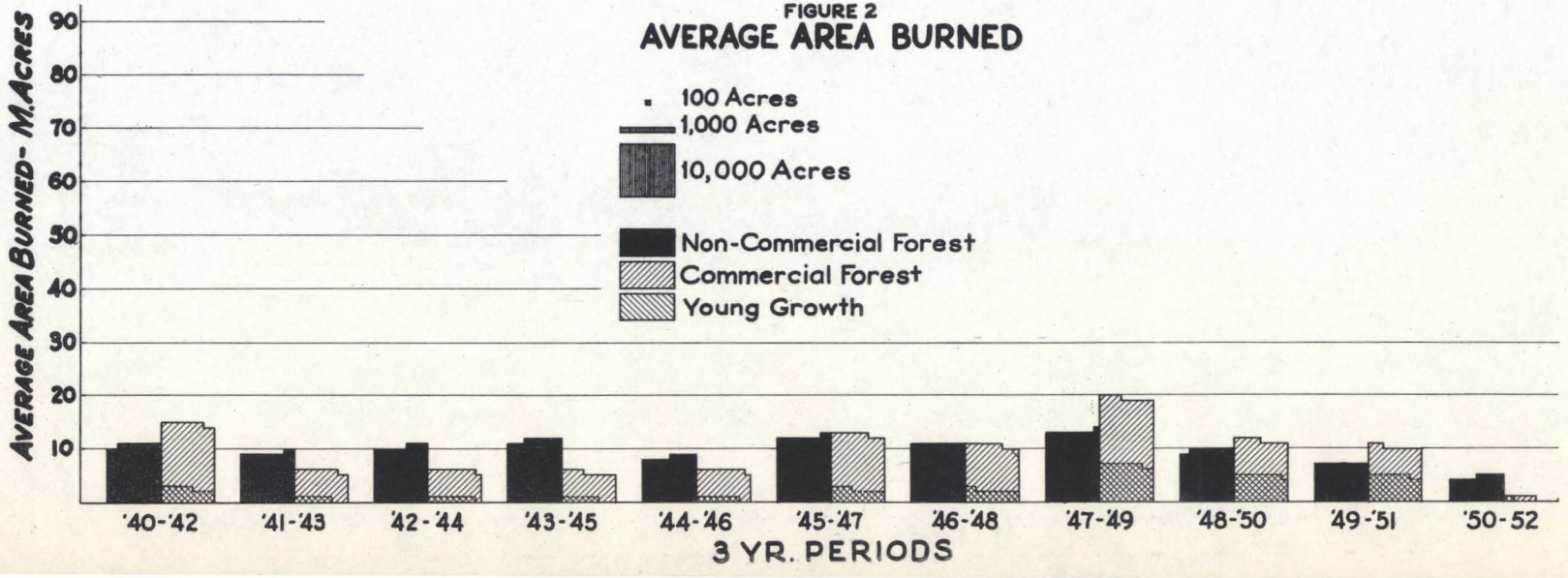


I-A-1 - Chart 9

FIRE LOSSES - REGION 4
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES







I-A-1 - Chart 10

FIRE LOSSES - REGION 5
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES

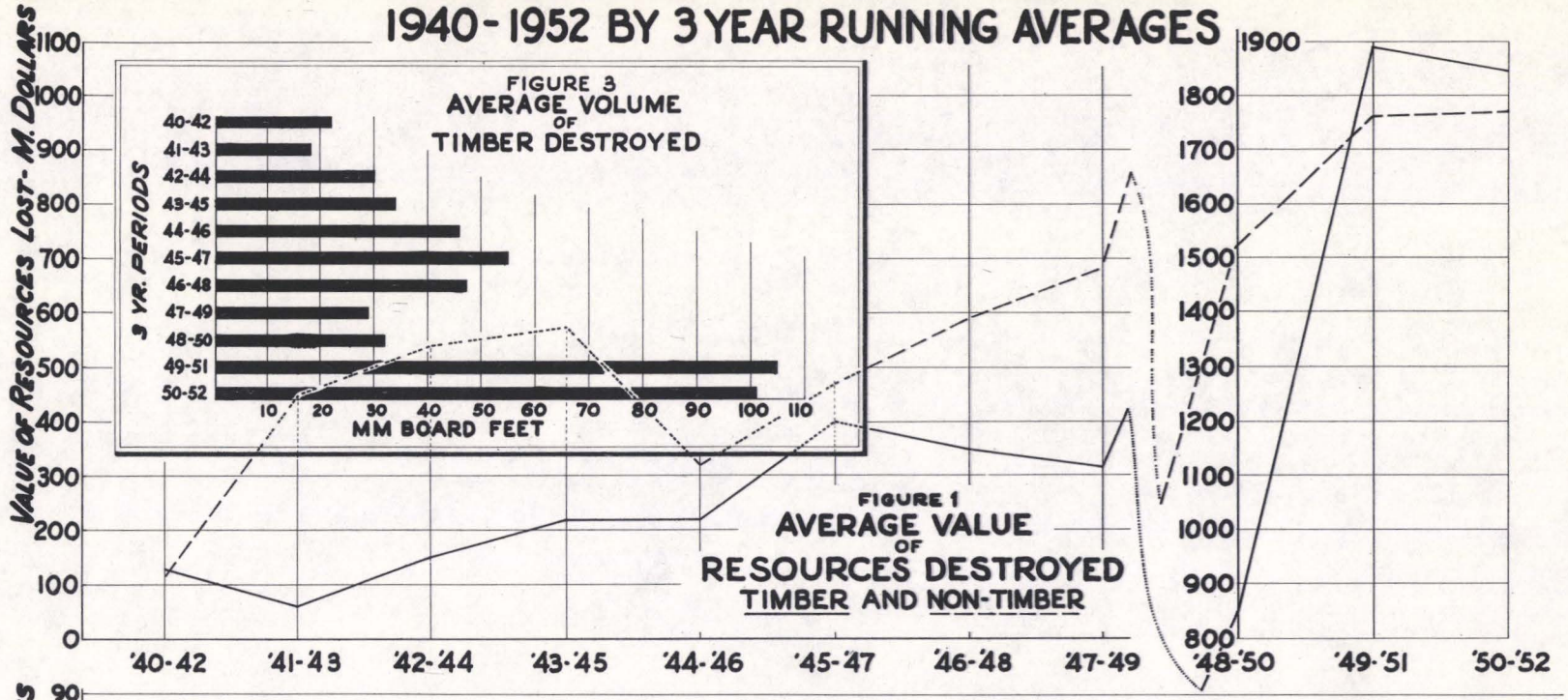


FIGURE 3
AVERAGE VOLUME
OF
TIMBER DESTROYED

FIGURE 1
AVERAGE VALUE
OF
RESOURCES DESTROYED
TIMBER AND NON-TIMBER

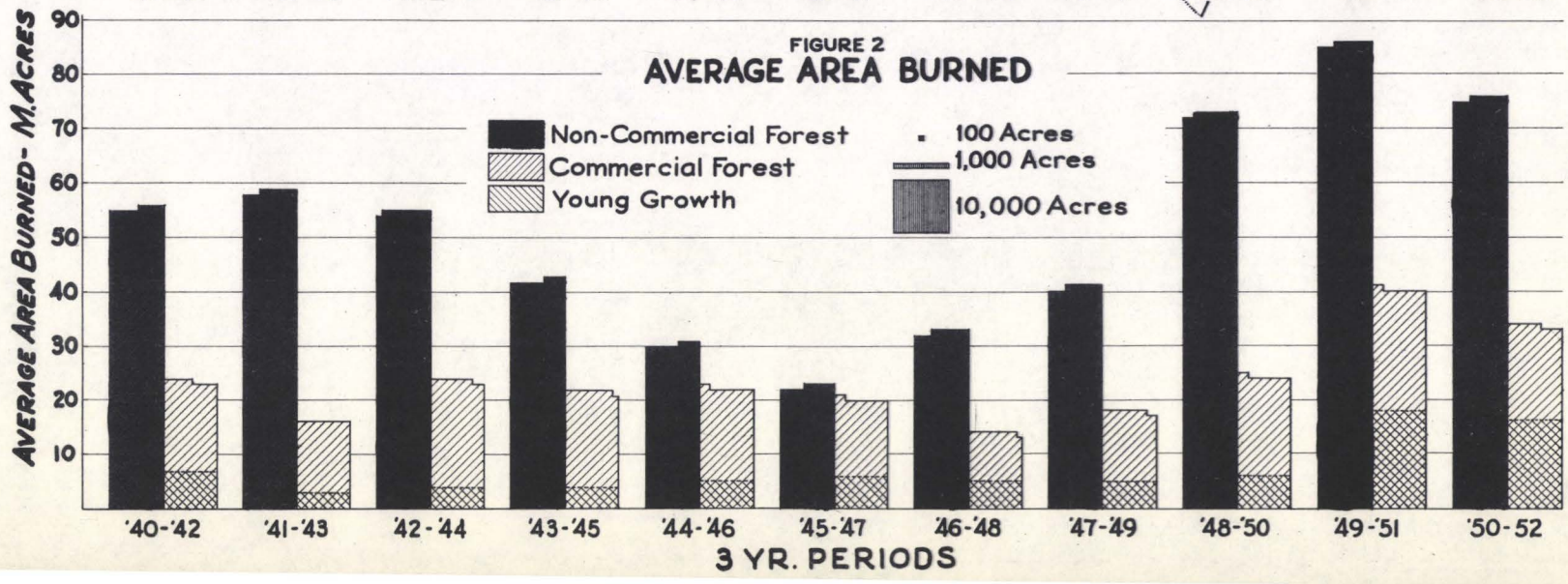


FIGURE 2
AVERAGE AREA BURNED

I-A-1 - Chart 11

FIRE LOSSES - REGION 6
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES

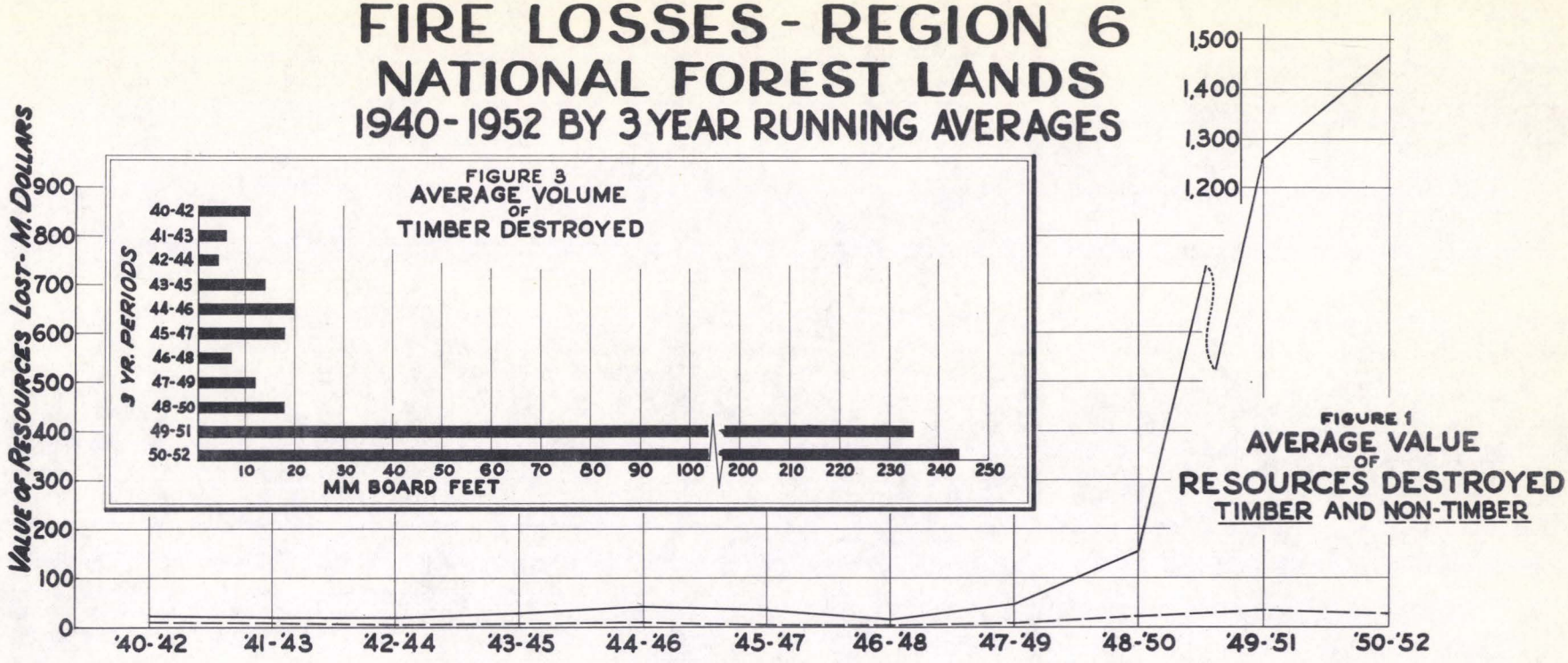
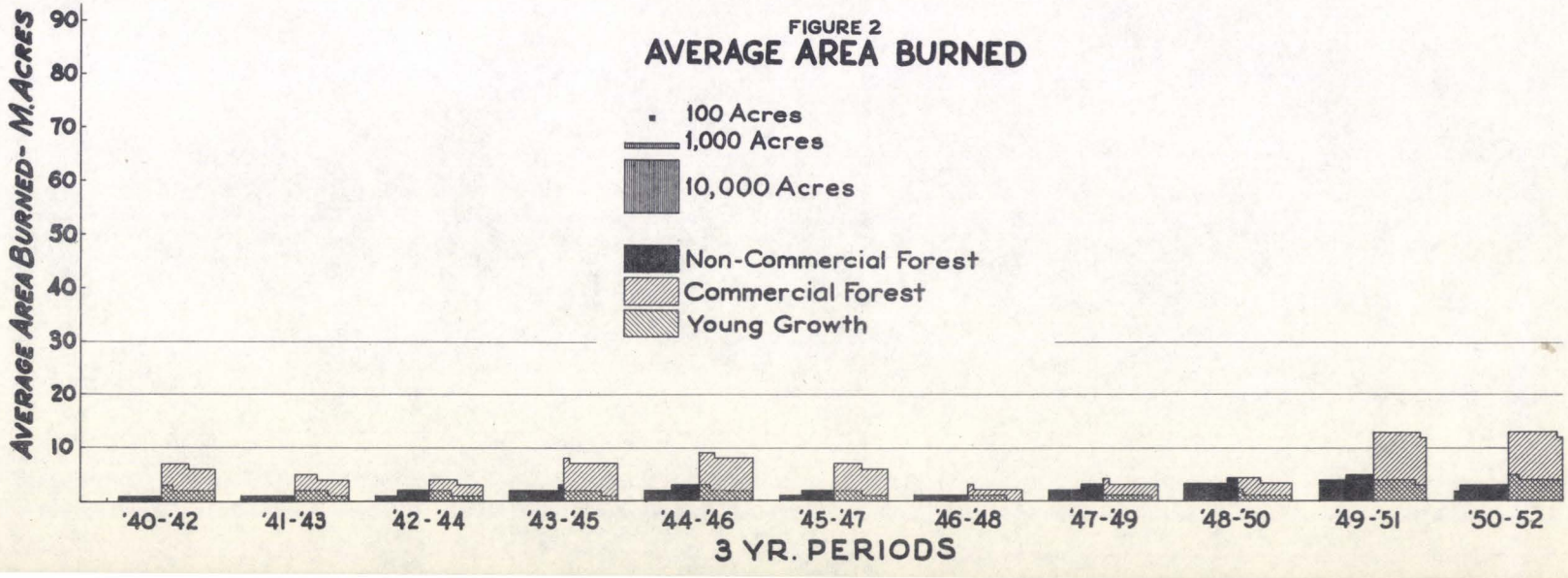
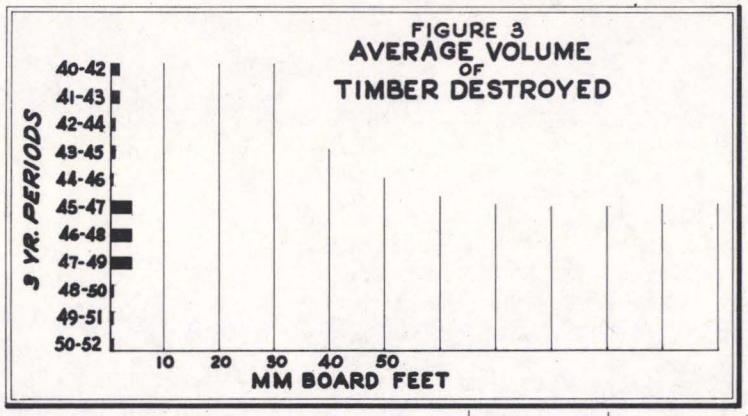


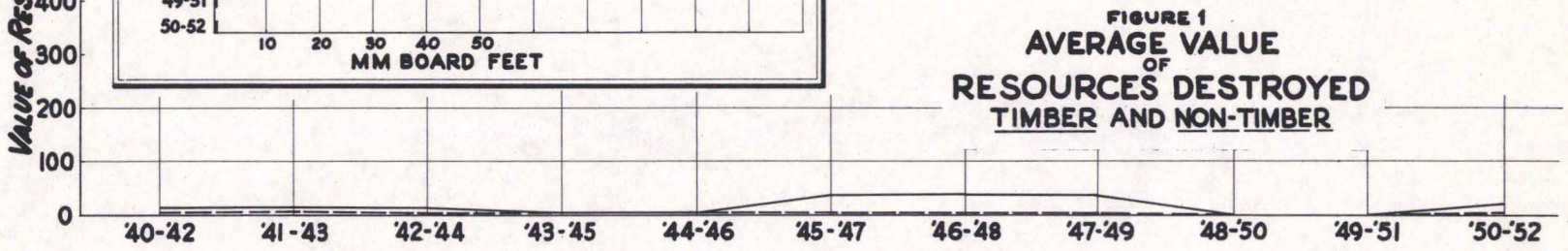
FIGURE 1
AVERAGE VALUE
OF
RESOURCES DESTROYED
TIMBER AND NON-TIMBER

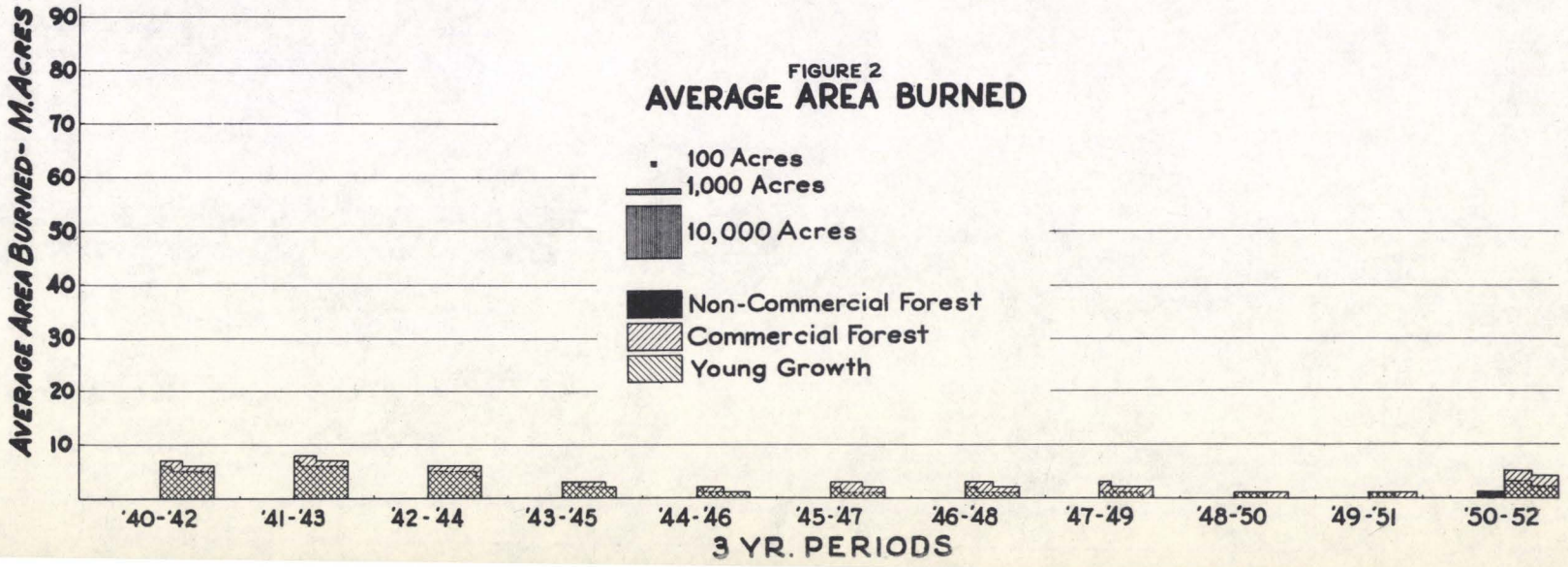


I-A-1 - Chart 12

FIRE LOSSES - REGION 7
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES

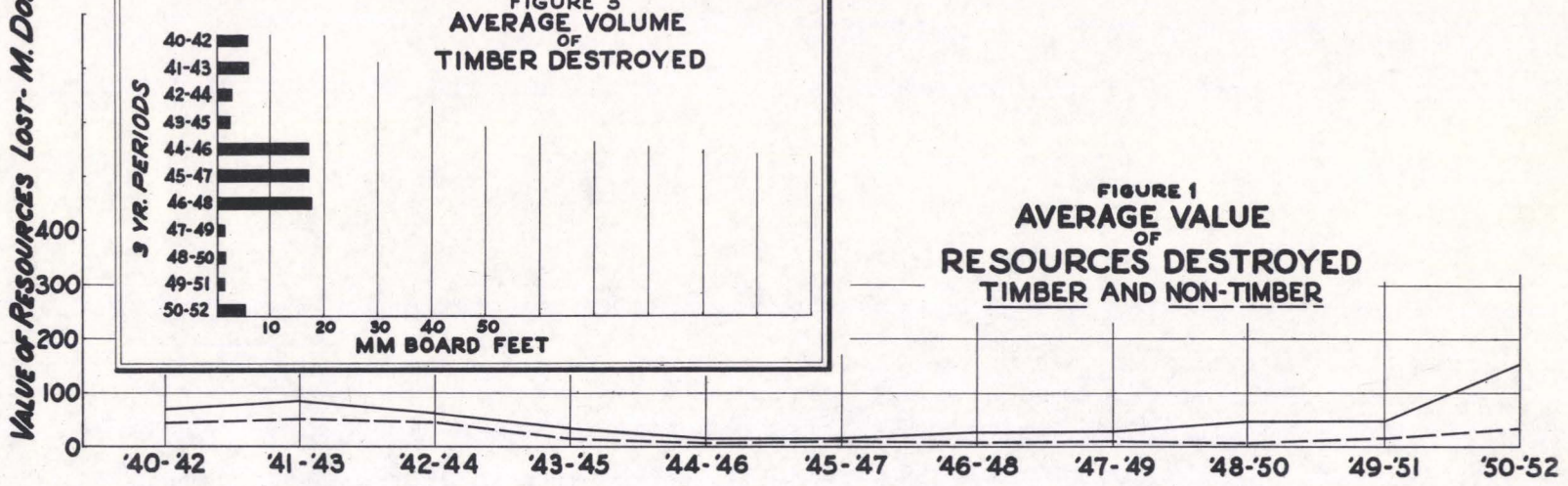


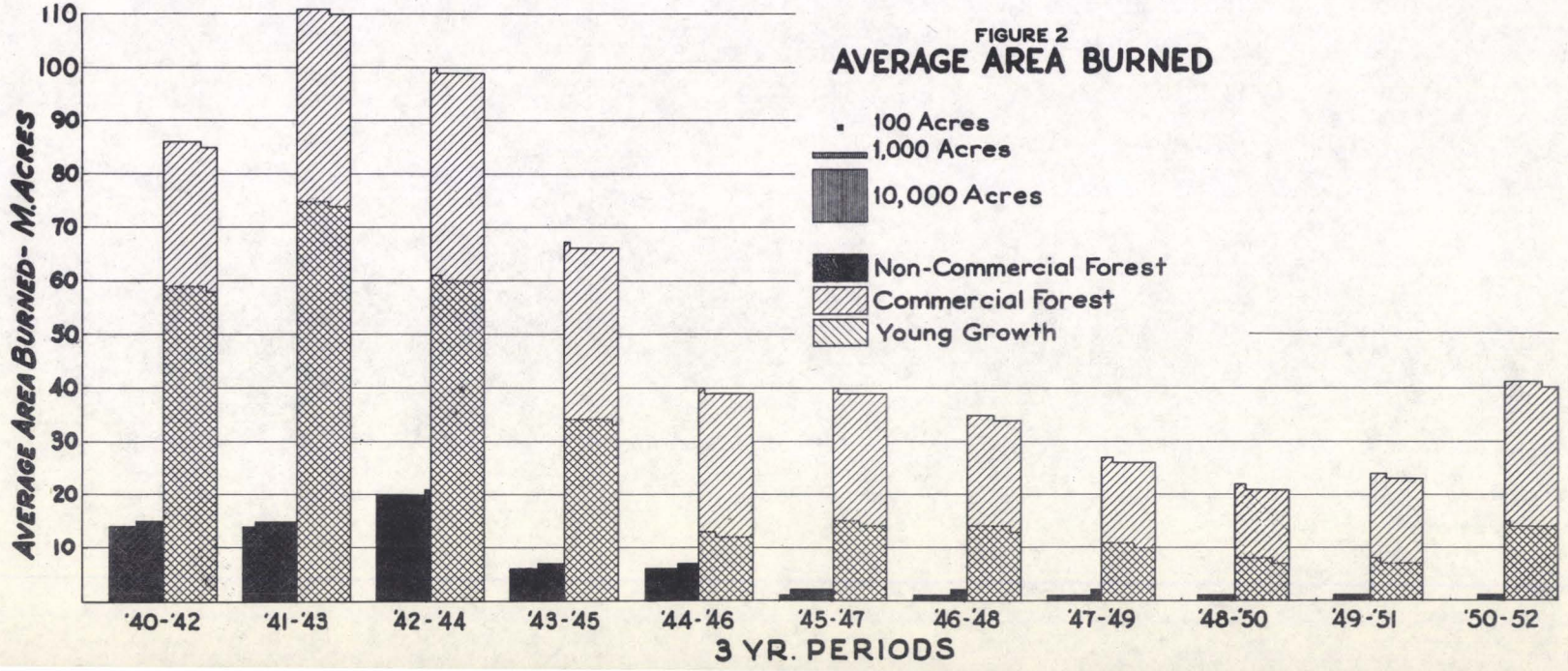




I-A-1 - Chart 13

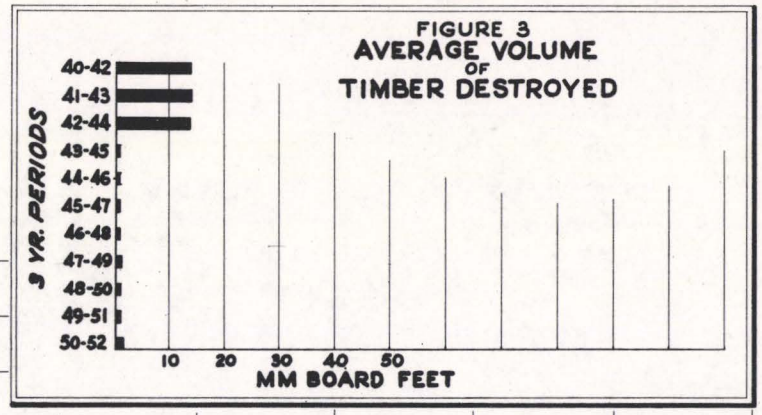
FIRE LOSSES - REGION 8
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES

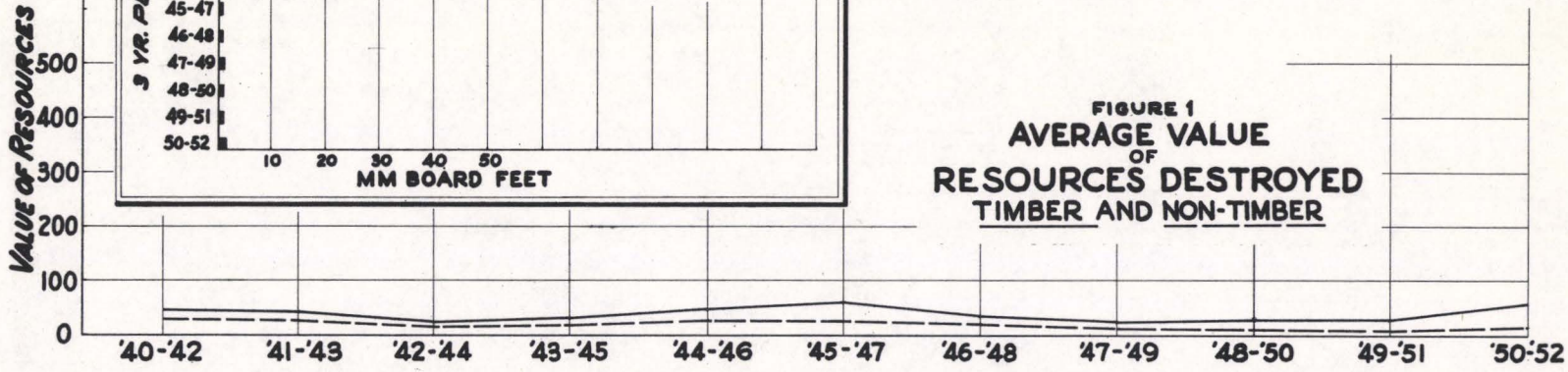


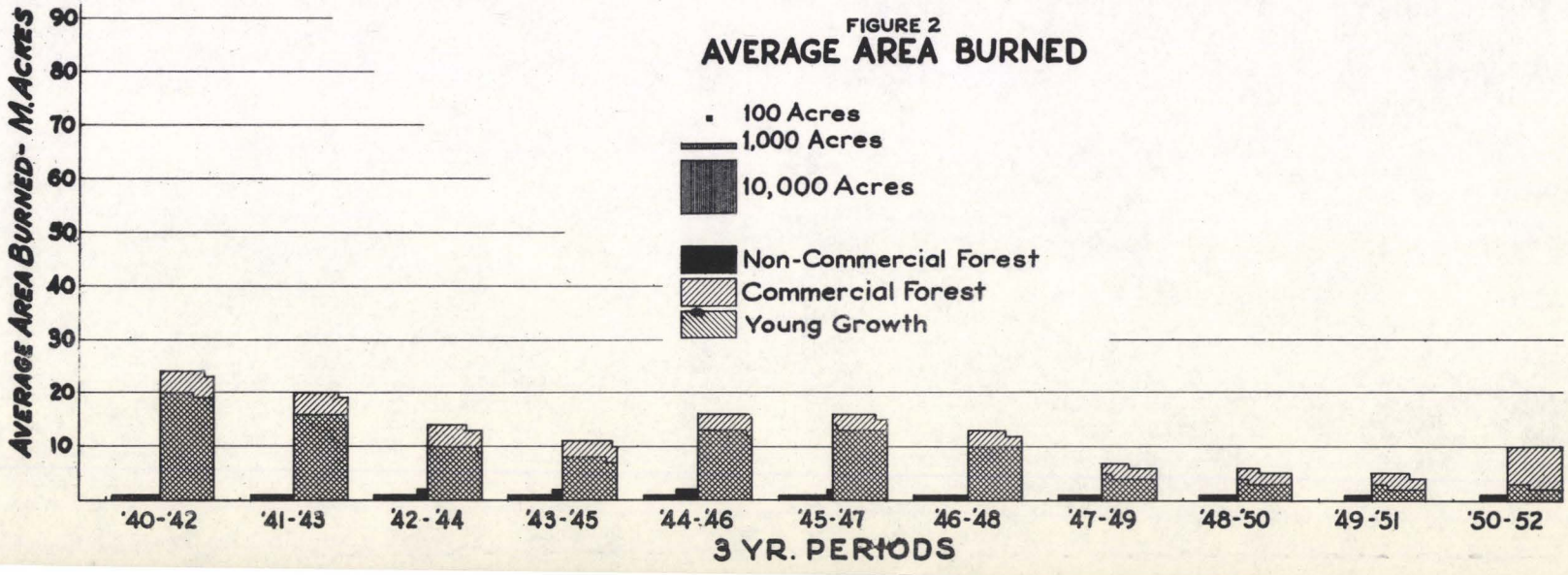


I-A-1 - Chart 14

FIRE LOSSES - REGION 9
NATIONAL FOREST LANDS
1940 - 1952 BY 3 YEAR RUNNING AVERAGES







I-A-1 - Chart 15

PROTECTION RESULTS

RESOURCE LOSSES AND THEIR OVERALL SIGNIFICANCE

To present the picture of resource losses on the national forests, we have prepared a series of graphs and charts. The first series of six charts illustrates the various resource losses for national forest land as a whole--for the entire United States. For the earlier years, beginning with 1906, resource losses are presented by varying periods. From 1906 to 1920, it is shown in 5-year periods; 1921 to 1927, it is shown as a separate period; 1928 to 1932 is shown as the 5-year period prior to the CCC program. The CCC period is shown as between 1933 and 1941. The more recent period from 1940 to 1952 has been plotted in a 3-year running average. This was done in order to better show the resource loss trend over a period of recent years. It is shown as a 3-year running average in order to take out extreme peaks and dips in the curve and better illustrate the trend. After all, it is the trend that seems most important to be concerned with at this time.

Chart No. 1 illustrates the volume of timber burned on national forest lands since the beginning of Forest Service protection. It will be noted in the early history of the Forest Service there were tremendous losses of timber from fire. The period of 1906-1910 showed an average annual loss of 1.4 billion board feet. Another high period was that between 1916 and 1920. The chart further illustrates that, as protection was strengthened, the loss in volume of timber was greatly reduced. A discouraging thing is to look at the right side of the chart and note the upward trend in loss of timber during the past few years. Some may argue that the overall significance of this is not great inasmuch as we are now in a better position to salvage fire-killed timber than we have ever been before in the history of the Forest Service. Experience in Region 5 in the past few years has indicated that as much as 80% of the fire-killed, merchantable timber has been salvaged following the fire. We should not overlook the fact, however, that large volume losses of commerical timber in any one year, in any one working circle, can have serious effect upon the management plan for that working circle and the stability of the dependent community.

The next three charts illustrate our resource losses in terms of area burned. Chart No. 2 shows the average annual area of commercial forest land burned. Here again, the early records of Forest Service protection have shown a desirable downward trend; but again, a disturbing point is that in the past few years this trend has again shot upward.

The next chart (No. 3) shows the average annual burn of young-growth forests. This chart, it seems to me, carries a considerable amount

of significance in that loss of young-growth can have a very serious impact upon the management of a working circle. In a managed forest, a high percentage of the allowable cut is based upon growth put on annually by young-growth stands of timber. A fire which kills a young--growth stand of timber up to 40 or 60 years of age leaves very little to be salvaged. Furthermore, most of these stands are at an age where their increment is very significant to the overall management plan. In an overall plan for protection of forest land, it is possible that we should be giving more consideration to protection of stands of young-growth than we are doing at the present time, based upon their great importance in a managed forest. Although the record over the years shows a very desirable trend in the loss of young-growth forests, it is again disturbing to note that that trend is now upward rather than downward.

The importance of national forest land from a water-producing standpoint has increased over the years that the national forests have been in existence. With the trend of heavy population movement to the west, the importance of our national forest watersheds becomes greater. Because of this, the importance of protection from fire of watershed lands becomes greater and greater.

Chart No. 4 illustrates the average annual burn on non-commercial forest lands--primarily our watershed lands. As in other resource losses, protection of national forest watershed lands has shown an improvement over the years; but here again, we find that the trend in the last few years has taken a turn for the worse. This at the same time that the values of such watershed cover are increased.

During the past few years, while the dollar value has been decreasing and the market value of property has materially increased, all of us have had to face our insurance agent with the need for increasing the amount of coverage that we have for our property. This, of course, has increased the premium we have had to pay. In addition to this, we have had our taxes increased in order that the local fire department could give us the same or better protection than we have had in the past. Making a comparison with the national forests, we find that the value of these publicly owned forests has increased tremendously. The average selling value of national forest stumpage in Region 5, for example, has increased from $1.95 per thousand in 1940 up to $17.15 per thousand in 1953, an increase of about 880%. Every tree growing on a national forest has an increased value. At the same time every acre of watershed land also has increased in value. Carrying the analogy further, John Q. Public pays an insurance premium on his valuable public property. The insurance premium that he pays is that which is expended for protection from fire of his forest property. Now, it is not part of my assignment to indicate the value of public property being protected, but the increased value will be apparent by looking at the trend in damages to this public property.

The damages are shown in two charts (Nos. 5 and 6). The first shows the damage in dollars to the timber resources on the national forest lands due to fire. The second shows the same thing for the non-timber resources. The dollar value of damages is shown as it was reported during the year when the damage occurred. From these two charts, it will be noted that at no time in the history of the Forest Service has the damages from fire, measured in values lost, been greater than it is at present. Looking at that part of the chart from 1940 to 1952, we find that the 3-year running average shows a low for the period 1940 to 1942 of a little over $800,000 total damage. For the 3-year periods, 1949 to 1951 and 1950 to 1952, total damages have been just under $7,000,000. These damages, measured dollar-wise, are greater than the historical bad fire period of 1906 to 1910 when the national forests had virtually no protection. Please keep in mind that all of the charts shown are for national forest land only.

It would seem to me that these two charts showing resource damages should be given careful consideration in determining the adequacies of any protection program.

RESOURCE LOSSES BY REGIONS

The second phase of presenting the resource losses to you is that of showing in what part of the United States the resource losses are occurring, and the trend in each of these regions. This I have endeavored to do by preparing one chart for each region, on which I have tried to show the same information that has been shown on the national charts. There is one difference, however, in that the regional charts have been prepared only for the period 1940 to 1952 (the period since statistics have been available on the punch cards). I feel that this is satisfactory since what we are concerned with is our present trend in protection rather than the history of past decades.

As with the national picture presented, the period between 1940 and 1952 is shown in a 3-year running average. The same scale is used on the charts for each region in order that the resource losses can be compared region-by-region more readily. Each of these charts has three figures. The bar graph at the bottom shows the area of both non-commercial and commercial timberland which has burned. Within the bar for commercial timberland burned is also shown the area of young-growth which has burned during each period. The graph at the top of the chart (shown as Figure 1) is a presentation of damages, expressed in dollars, both in timber resource and non-timber resources. The inserted bar graph (Figure 3) shows the resource losses in terms of timber volume lost.

It will be noted from a study of these charts that the heavy timber damages are occurring in Regions 5 and 6. The heavy losses in non-commercial timberland burned over are primarily in the Western Regions, with Region 5 having the greatest losses in this regard. When we come to the subject of commercial timberland losses and acres of young-growth lost, such regions as 8 and 9 have had heavy losses as well as Region 5. Region 3 also is showing up in the picture with an upward trend of resource losses from fire.

LOSSES BY MANAGEMENT UNITS

Another method of showing resource loss is to express the loss in percentage of area burned. A commonly used figure is an allowable burn of one tenth of one percent. I have purposely not shown a chart for the Service as a whole expressed in percent of burn. I think it would be extremely dangerous to show losses or progress in such a manner. It would give the wrong picture. Trees which are saved in the White Mountains of New Hampshire by burning less than the allowable burn certainly are not available to help stabilize the communities of Alturas or Susanville in California, where the allowable burn may be exceeded by a great margin.

Allowable burn figures were set up by considering what any management unit might annually sustain without seriously upsetting the management. We should continue to use this measure, management unit by management unit, and not for the Service as a whole or a region as a whole.

When a national forest is used as a management unit, the chance of showing a wrong picture is lessened; but the proper way would be to consider it by working circles, watersheds, or other such management units.

Statistics are not readily available to show the picture of the number of true management units where resources losses are within or outside of an allowable burn. The following may, however, be of interest to this group:

Gustafson recently made an analysis which shows that 35 national forests in our entire system accounted for 74% of the damage to resources. This was for the period 1947-1951. The same 35 forests were the "bad boys" for the period 1942-1944 when they accounted for 79% of the total resource damages.

Ex-Regional Forester Show recently studied California fires for a 30-year period, 1921 to 1950. He found that <u>as a group</u> the 14 Northern California forests held burn to allowable only six times. <u>As a group</u> the 4 Southern California forests met objectives only once in the 30 years. Using the individual national forest and the year

as a unit, and for the same 30-year period, in Northern California the burn has been held to allowable in 172 out of 390 cases; in Southern California objective was met in only 76 out of 120 cases.

It is not necessary to tell you that 16 of California's 18 national forests qualify as belonging to Gustafson's 35 "bad boys". In fact, when we leave R-5's two "good boys" (Eldorado and Inyo) out of the picture, we find that the remaining forests hold burned area to an acceptable allowable only about one half the time---242 out of 450 cases.

This is a discouraging set of statistics to view at a time when national forests' resources are of such tremendous importance to the nation as a whole.

SUMMARY

To summarize, we might point out the following: National forest lands experienced terrific losses in resources during the early history of the Forest Service. Through increased protection, these overall losses were brought down as it was possible to give better protection. The alarming thing that is pointed out in this analysis is that during the past few years the trend in resource losses is going upward rather than continuing downward as it should. For each of the presentations showing resource losses, this upward trend has appeared in the past few years. It has been so great that it shows up in the overall national figures in spite of the fact, as we all know, that the law of averages always has the effect of leveling out bad losses in any one region during any one year. When values of the properties that are being destroyed are considered, the upward trend in losses is even more staggering and significant.

I will complete this presentation with this sobering thought. Based on the present trends in resource losses, the Forest Service is not now doing an adequate job of protecting the nation's valuable national forest resources from their ever-present enemy FIRE.